

EXHIBIT A

CURRICULUM VITAE

IRA STEPHEN COHEN

Address: (Home) 23 Hawks Nest Road, Stony Brook, New York 11790
(Office) Department of Physiology & Biophysics, 8661 SUNY,
Stony Brook, NY 11794-8661

Birthdate: July 6, 1948

Marital Status: Married, two children

HIGHER EDUCATION:

1965-1969. Columbia University, B.A., Chemistry (Chemical-Physics)

1969-1974. N.Y.U. School of Medicine, M.D., Medicine

1970-1974. N.Y.U. Graduate School, Ph.D., Physiology & Biophysics

6/74-9/74. Woods Hole (MBL), Postdoctoral, Neurobiology
(Grass Foundation Neurophysiology Fellow)

1974-1976. University Laboratory of Physiology, Oxford, Postdoctoral,
cardiac electrophysiology (Postdoctoral Research Fellow, supported by MDA)

FACULTY POSITIONS:

1976-1981. Assistant Professor, Physiology & Biophysics,
SUNY at Stony Brook

1981-1987. Associate Professor, Physiology & Biophysics,
SUNY at Stony Brook

1984-1989. Adjunct Associate Professor, Pharmacology,
Columbia University

- 1987- 2001 Professor, Physiology & Biophysics,
SUNY at Stony Brook
- 1989- Adjunct Professor, Pharmacology, Columbia University
- 1989- 2005 Professor of Medicine, SUNY at Stony Brook
- 1997- Director, Institute of Molecular Cardiology, SUNY at Stony Brook
- 2001- Leading Professor of Physiology & Biophysics
SUNY at Stony Brook

CURRENT RESEARCH ACTIVITIES:

- 1977-2005. Cardiac Electrophysiology Effects of Ions and Drugs-
P.I. Funded by National Heart, Lung and Blood Institute.
- 1983-2009. Developmental Cardiac Electrophysiology- P.I. of one
project in program project grant entitled "Regional and Species Regulation
of Pacemaker Current".
Funded by National Heart, Lung and Blood Institute.
- 2001-2011. Memory, Remodeling, and Ventricular Arrhythmias.
P.I. of subcontract. Funded by National Heart, Lung and Blood Institute.
- 2001-2007. Development and Implantation of a Biological Pacemaker.
P.I. of sub contract. Support by Guidant, Inc.
- 2004-2009. Genes, Stem Cells and Biological Pacemakers.
P. I. of contract. Support by Guidant, Inc.

HONORS:

- 1970-1974. Medical Scientist Training Fellow (M.D.-Ph.D. Program), NYU
- 1974. Grass Foundation Fellowship, Neurobiology, Woods Hole
- 1974-1976. MDA Post-doctoral Fellowship
- 1978-1983. Research Career Development Award, NHLBI

1990-2000 NHLBI Merit Award

2004. Excellence in the Pursuit of Knowledge Award, Research Foundation of SUNY

EDITORIAL BOARDS:

1990-1995 American Journal of Physiology (Cell)

1991-1995 Physiological Reviews

1993- Journal of General Physiology

1999-2006 Journal of Physiology

MEMBERSHIPS IN SCIENTIFIC SOCIETIES:

The Biophysical Society

The Physiological Society (England)

The Harvey Society

The Society of General Physiologists

The American Physiological Society

The American Heart Association

SERVICE ON PEER REVIEW PANELS:

1983. Site visit to Duke University for Physiology Study Section

1983. Site visit to Albert Einstein for NHLBI

1983. Physiology Study Section

1983-1985. Member New York State Heart Assn. Peer Review Panel

1984. Site visit to Emory for NHLBI

1986. Cardiovascular and Pulmonary Study Section (CVA)
- 1987-1991. Member of Physiology Study Section
1989. Site visit to UCLA, Dept. of Physiology, for University evaluation of graduate education
- 1992-1993. New York City Heart Association Peer Review Panel
1993. Site visit for NHLBI on PPG submitted by H. Criss Hartzell
- 2003- NY Academy of Medicine Glorney Riesbeck Fellowship Selection Committee

PAST AND PRESENT SERVICE ON INSTITUTIONAL AND UNIVERSITY WIDE COMMITTEES:

Curriculum Committee

Appointments, Promotions and Tenure Committee

Academic Standing Committee

Laboratory Animal Users Committee

Steering Committee for Pharmacological Sciences

Sponsored Programs Advisory Committee of SUNY

TEACHING RESPONSIBILITIES:

Cardiac Electrophysiology and Pharmacology: To first and second year medical students

Excitable Membranes: To graduate students

NATIONAL & INTERNATIONAL MEETINGS:

- 2002. FASEB Symposium speaker, New Orleans, Louisiana.
- 2002. American Heart Association Symposium speaker, Chicago, Illinois.
- 2004. Invited speaker, Oklahoma Heart Institute, Continuing Education for Cardiologists, Las Vegas, Nevada.
- 2004. Invited speaker, Cardiotim, Nice, France.
- 2004. Invited speaker, Pan Guidant Biologics Board meeting, New Orleans, Louisiana.
- 2005. Invited speaker, Gordon Conference on Arrhythmias, Santa Ynez, California.
- 2005. Invited speaker, Current Concepts in Cardiovascular Medicine, London, England.
- 2005. Invited speaker, Mammalian Myocardium meeting, Bristol, England.
- 2005. Invited speaker, European Working Group on Cardiac Electrophysiology, Antwerp, Belgium.
- 2006. Invited speaker, Biodesign New Arrhythmia Technology retreat, Stanford, CA.
- 2006. Invited speaker, Cardiotim, Nice, France.
- 2006. Invited speaker, Dennison Young Memorial Symposium, Northeast Pediatric Cardiology Association, New York, NY.
- 2007. Invited speaker, 28th Annual Scientific Sessions of Heart Rhythm Society, Denver, Colorado.
- 2007. Invited speaker, 3rd International Conference on Cell Therapy for Cardiovascular Disease, New York, NY.
- 2007. Invited speaker, International Society for Computerized Electrocardiology, Cancun Mexico.
- 2008. Invited speaker, The SCAI Annual Scientific Sessions in Partnership with ACCi2 Summit, Chicago, Illinois.
- 2008. Invited speaker, Cardiotim 16th World Congress in Cardiac Electrophysiology and Cardiac Techniques, Nice, France.

Ph.D. STUDENTS SUPERVISED:

Robin Falk
Nancy Mulrine
Anu Shah
Carlos Oliva
Jianmin Cui
Fang Chang
Hangang Yu
Jiying Wu
Damon Kelly
Victor Tselentakis
Adam Schuldt (M.D., Ph.D.)
Amy Rosen (M.D., Ph.D.)

Ph.D. STUDENTS CURRENT:

Ling Li

POST DOCTORAL SUPERVISION:

Richard Kline
Jianmin Cui
Hangang Yu
Fang Chang
Nicholas Datyner
Gary Gintant
Sarita Yeola
Jiying Wu
Irina Potapova
Sergey Doronin
Damon Kelly
Zhongju Lu
Jia Lu

PATENTS AND PATENT APPLICATIONS:**APPLICATION
NO.****TITLE**

11/240,948 (U.S.)	USE OF HUMAN STEM CELLS AND/OR FACTORS THEY PRODUCE TO PROMOTE MAMMALIAN CARDIC REPAIR THROUGH CARDIOMYOCYTE CELL DIVISION
11/296,018 (U.S.)	USE OF HUMAN STEM CELLS AND/OR FACTORS THEY PRODUCE TO PROMOTE MAMMALIAN CARDIC REPAIR THROUGH CARDIOMYOCYTE CELL DIVISION

05825074.7 (European)	USE OF HUMAN STEM CELLS AND/OR FACTORS THEY PRODUCE TO PROMOTE MAMMALIAN CARDIC REPAIR THROUGH CARDIOMYOCYTE CELL DIVISION
11/227,533 (U.S.)	DIFFERENTIATION OF HUMAN MESENCHYMAL STEM CELLS TO CARDIAC PROGENITOR CELLS THAT PROMOTE CARDIAC REPAIR
05812162.5 (European)	DIFFERENTIATION OF HUMAN MESENCHYMAL STEM CELLS TO CARDIAC PROGENITOR CELLS THAT PROMOTE CARDIAC REPAIR
10/34,506 (U.S.)	MESENCHYMAL STEM CELLS AS A VEHICLE FOR ION CHANNEL TRANSFER IN SYNCYTIAL STRUCTRES
10/757,827 (U.S.)	MESENCHYMAL STEM CELLS AS A VEHICLE FOR ION CHANNEL TRANSFER IN SYNCYTIAL STRUCTRES
04702196.9 (European)	MESENCHYMAL STEM CELLS AS A VEHICLE FOR ION CHANNEL TRANSFER IN SYNCYTIAL STRUCTRES
2006-500957 (Japan)	MESENCHYMAL STEM CELLS AS A VEHICLE FOR ION CHANNEL TRANSFER IN SYNCYTIAL STRUCTRES
PCT/US07/16429 (International)	COMPOSITIONS OF LATE PASSAGE MESENCHYMAL CELLS (MSCs)
PCT/US07/16430 (International)	USE OF LATE PASSAGE MESENCHYMAL STEM CELLS (MSCs) FOR TREATMENT OF CARDIAC DISORDERS
60/919,593 (U.S.)	QUANTUM DOT LABELED STEM CELLS FOR USE IN CARDIAC REPAIR
60/936,874 (U.S.)	QUANTUM DOT LABELED STEM CELLS FOR USE IN CARDIAC REPAIR
60/919,627 (U.S.)	QUANTUM DOT LABELED STEM CELLS FOR USE IN PROVIDING PACEMAKER FUNCTION
60/936,873 (U.S.)	QUANTUM DOT LABELED STEM CELLS FOR USE IN PROVIDING PACEMAKER FUNCTION
61/004,335 (U.S.)	FIBROPLASTS DERIVED STEM CELLS

PUBLICATIONS

1. Cohen, I., Kita, H., & Van der Kloot, W.G., (1973). Miniature end-plate potentials evidence that the intervals are not fit by a Poisson distribution. *Brain Res.* 54, 318- 323.
2. Cohen, I., Kita, H., & Van der Kloot, W.G. (1974). The intervals between miniature end-plate potentials are unlikely to be independently or exponentially distributed. *J. Physiol.*, 236, 327-339.
3. Cohen, I., Kita, H., & Van der Kloot, W.G. (1974). The stochastic properties of spontaneous quantal release at the frog neuromuscular junction. *J. Physiol.* 236, 341-361.
4. Cohen, I., Kita, H., & Van der Kloot, W.G. (1974). Stochastic properties of spontaneous transmitter release at the crayfish neuromuscular junction. *J. Physiol.* 236, 363-371.
5. Van der Kloot, W.G., Kita, H., & Cohen, I. (1975). The timing of the appearance of min.e.p.p.s. *Progress in Neurobiology*, Vol. IV, Pt. IV, 269-326.
6. Cohen, I., Daut, J., & Noble, D. (1976). The influence of extracellular K^+ ions on the action of ouabain on membrane currents in sheep Purkinje fibres. *J. Physiol.* 260, 55-75.
7. Cohen, I., Daut, J., & Noble, D. (1976). The effects of ouabain on membrane currents in sheep Purkinje fibres. *J. Physiol.* 260, 75-105.
8. Cohen, I., Giles, W., & Noble, D. (1976). A cellular basis for the T wave. *Nature* 262, 657-661.
9. Cohen, I., & Van der Kloot, W.G. (1976). The effect of changing pH on spontaneous release at the frog neuromuscular junction. *J. Physiol.* 262, 401-414.
10. Cohen, I., and Strichartz, G. (1977). On the voltage dependent binding of TTX. *Biophys. J.* 17, 275-279.
11. Barton, S.B. and Cohen, I.S. (1977). Are Transmitter Release Statistics Meaningful? *Nature* 268, pp. 267-268.
12. Attwell, D., and Cohen, I. (1977). The Voltage Clamp of Multicellular Preparations. *Prog. in Biophys. and Mol. Biol.* 31, 201-245.
13. Noble, D. and Cohen, I.S. (1978). The Origin of the T Wave of the Electrocardiogram. *Cardiovascular Res.* XII #L, pp. 13-27.

14. Brown, R., Cohen, I., and Noble, D. (1978). The effects of Ca^{+2} and pH on membrane currents in sheep Purkinje fibres. *J. Physiol.* 282, 345-352.
15. Cohen, I., Eisner, D.A. and Noble, D. (1978). Effects of Adrenaline on the Pacemaker Potential in Cardiac Purkinje Fibres. *J. Physiol.* 280, 155-168.
16. Cohen, I.S. and Van der Kloot, W.G. (1978). On the Effects of Ca^{+2} and Mg^{+2} on miniature end-plate currents. *Nature* 271, 77-79.
17. Strichartz, G. and Cohen, I. (1978). V_{max} as a Measure of G_{Na} in Nerve and Cardiac Membranes. *Biophys. J.* 23, 153-156.
18. Cohen, I., Noble, D., Ohba, M. and Ojeda, C. (1979). The use of sodium salicylate to counter glycoside toxicity. *J. Physiol.* 297, 187-207.
19. Cohen, I., Noble, D., Ohba, M. and Ojeda, C. (1979). The effects of sodium salicylate on sheep cardiac Purkinje fibres. *J. Physiol.* 297, 163-187.
20. Attwell, D., Cohen, I., Eisner, D., Ohba, M. and Ojeda, C. (1979). The steady state TTX-sensitive ("window") sodium current in cardiac Purkinje fibres. *Pflugers Archiv.* 379, 137-142.
21. Van der Kloot, W.G. and Cohen, I. (1979). Membrane Surface Potential Changes may alter Drug Interactions: An Example, Acetylcholine and Curare. *Science* 203, 1351-1353.
22. Cohen, I. (1979). Some difficulties in the experimental use of V_{max} as a measure of g_{Na} in cardiac membranes. *Circ. Res.* 45, 309-312.
23. Attwell, D., Cohen, I. and Eisner, D. (1979). Membrane Potential Stability Conditions: Effects of a Restricted Extracellular Space. *Proc. Roy. Soc. B* 206, 145-162.
24. Attwell, D., Eisner, D. and Cohen, I. (1979). Voltage Clamp and Tracer Flux Data: Effects of a Restricted Extracellular Space. *Quart. Rev. of Biophys.* 12, 213-261.
25. Kline, R., Cohen, I., Falk, R. and Kupersmith, J. (1980). Activity Dependent Extracellular K^{+} Fluctuations in Canine Purkinje Fibers. *Nature* 286, 68-71.
26. Cohen, I., Falk, R. and Kline, R. (1981). Membrane Currents Following Activity in Canine Cardiac Purkinje Fibers. *Biophys. J.* 33, 281-288.
27. Attwell, D., Cohen, I. and Eisner, D. (1981). The effects of heart rate on the action potential of human and guinea pig ventricular muscle. *J. Physiol.* 313, 439-461.

28. Cohen, I., Van der Kloot, W.G. and Attwell, D. (1981). The timing of channel opening during spontaneous release at the frog neuromuscular junction. *Brain Res.* 223, 185-189.
29. Cohen, I., Attwell, D. and Strichartz, G. (1981). The dependence of the rate of rise of the action potential on membrane parameters. *Proc. Roy. Soc. B.* 214, 85-98.
30. Cohen, I., Van der Kloot, W.G., and Barton, S. (1981). Bursts of Miniature End-Plate Potentials can be released from localized regions of the frog motor nerve terminal. *Brain Res.* 221, 382-386.
31. Barton, S.B. and Cohen, I. (1982). Facilitation and Impulse Propagation Failure at the frog neuromuscular junction. *Pflugers Archiv.* 392, 327-334.
32. Cohen, I. and Van der Kloot, W.G. (1982). The Interaction of Extracellular H^+ , Na^+ , Ca^{2+} , and Sr^{2+} on the decay of miniature end-plate currents. *Brain Res.* 241, 285-291.
33. Cohen, I. and Kline, R. (1982). K^+ fluctuations in the extracellular spaces of cardiac muscle: Evidence from the voltage clamp and K^+ selective microelectrodes. *Circ. Res.* 50, 1-16.
34. Cohen, I., Falk, R. and Kline, R. (1982). Pacemaker activity in Purkinje fibers: A voltage clamp analysis. In Normal and Abnormal Conduction in the Heart, editors de Carvalho, Hoffman and Lieberman. Futura, pp. 287-312.
35. Cohen, I., Falk, R. and Mulrine, N. (1983). Actions of barium and rubidium on membrane currents in canine Purkinje fibers. *J. Physiol.* 338, 589-612.
36. Cohen, I., Falk, R. and Kline, R. (1983). Voltage Clamp studies on the canine Purkinje strand. *Proc. Roy. Soc. B.* 217, 215-236.
37. Eisenberg, B. and Cohen, I. (1983). The ultrastructure of the canine Purkinje strand: a morphometric analysis. *Proc. Roy. Soc. B.* 217, 191-213.
38. Barton, S.B., Cohen, I. and Van der Kloot, W.G. (1983). The calcium dependence of evoked quantal release at the frog neuromuscular junction. *J. Physiol.* 337, 735-751.
39. Cohen, I. and Van der Kloot, W.G. (1983). The effects of temperature and terminal membrane potential on quantal size at the frog neuromuscular junction. *J. Physiol.* 336, 335-344.
40. Cohen, I. (1983). Can blocking the Na/K exchange pump lead to a reduction in $[Na^+]_i$? *Experientia* 39, 1280-1282.

41. Baldo, G., Cohen, I. and Van der Kloot, W.G. (1983). Facilitation and the nerve action potential at the frog neuromuscular junction. *Pflugers Archiv.* 399, 161-165.
42. Binah, O., Cohen, I.S. and Rosen, M.R. (1983). The Effects of Adriamycin on Normal and Ouabain-Toxic Canine Purkinje and Ventricular Muscle Fibers. *Circ. Res.* 53, 655-622.
43. Gintant, G., Datyner, N. and Cohen, I. (1984). Slow inactivation of a tetrodotoxin sensitive current in canine cardiac fibers. *Biophys. J.* 45, 509-512.
44. Falk, R. and Cohen, I. (1984). Membrane current following activity in canine cardiac Purkinje fibers. *J. Gen. Physiol.* 83, 771-799.
45. Van der Kloot, W.G. and Cohen, I. (1984). End-plate potentials in a model muscle fiber: corrections for the effects of membrane potential on currents and channel lifetimes. *Biophys. J.* 45, 905-912.
46. Van der Kloot, W. and Cohen, I. (1984). Temperature effects on spontaneous and evoked quantal size at the frog neuromuscular junction. *Journal of Neuroscience* 4, 2200-2203.
47. Kline, R.P. and Cohen, I. (1984). Extracellular $[K^+]$ fluctuations in voltage-clamped canine cardiac Purkinje fibers. *Biophys. J.* 46, 663-668.
48. Cohen, I., Falk, R. and Gintant, G. (1984). Saturation of the internal sodium site of the sodium pump can distort estimates of potassium affinity. *Biophys. J.* 46, 719-727.
49. Cohen, I. and Van der Kloot, W.G. (1985). Calcium and transmitter release. *International Review of Neurobiology* 27, 299-336.
50. Gintant, G.A., Datyner, N.B. and Cohen, I.S. (1985). Gating of delayed outward rectifiers in acutely dissociated canine cardiac Purkinje myocytes: evidence for a single channel mechanism. *Biophys. J.* 48, 1059-1064.
51. Datyner, N.B., Gintant, G.A. and Cohen, I.S. (1985). Microprocessor controlled trituration devise for the dissociation of cardiac and other tissues. *Pflugers Archiv.* 403, 105-108.
52. Datyner, N.B., Gintant, G.A. and Cohen, I.S. (1985). Versatile temperature controlled tissue bath for studies of isolated cells using an inverted microscope. *Pflugers Archiv.* 403, 318-323.
53. Cohen, I., Datyner, N., Gintant, G., Mulrine, N. and Pennefather, P. (1985). A note on the relation of maximum upstroke velocity to peak inward current recorded by the voltage

clamp. *Circ. Res.* 57, 482-484.

54. Van der Kloot, W. and Cohen, I. (1985). Localizing the site of generation of uni-quantal end-plate potentials using two intracellular microelectrodes. *Neuroscience Letters* 62, 57-62.

55. Cohen, I. and Mulrine, N. (1986). Effects of Thallium on membrane currents at diastolic potentials in canine cardiac Purkinje strands. *J. Physiol.* 370, 285-298.

56. Baldo, G.J., Cohen, I.S. and Van der Kloot, W. (1986). Estimating the time course of evoked quantal release at the frog neuromuscular junction using end-plate current latencies. *J. Physiol.* 374, 503-513.

57. Cohen, I. and Van der Kloot, W. (1986). Facilitation and delayed release at single frog neuromuscular junctions. *J. Neuroscience* 6(8), 2366-2370.

58. Van der Kloot, W., Cohen, I.S. and Barton, S.B. (1986). Resting calcium levels and evoked release at the neuromuscular junction. In Calcium, Neuronal Function and Transmitter Release, editors B. Katz and R. Rahamimoff. Martinus Nijhoff Publishing, pp. 163-180.

59. Cohen, I., Datyner, N., Gintant, G. and Kline, R. (1986). Time dependent outward currents in the heart. In The Heart and Cardiovascular System: Scientific Foundations, editors H. Fozzard, E. Haber, R. Jennings, A. Katz and H. Morgan. Raven Press, pp. 637-669.

60. Cohen, I., Datyner, N.B., Gintant, G.A., Mulrine, N.K. and Pennefather, P. (1987). Properties of an electrogenic Na/K pump in isolated Canine Purkinje myocytes. *J. Physiol.* 383, 251-267.

61. Cohen, I.S., Kline, R.P., Pennefather, P. and Mulrine, N.K. (1987). Models of the Na/K pump in cardiac muscle predict the wrong intracellular Na⁺ activity. *Proc. Roy. Soc. B* 231, 371-382.

62. Shah, A.K., Cohen, I.S. and Datyner, N.B. (1987). Background K⁺ current in isolated canine cardiac Purkinje myocytes. *Biophys. J.* 52, 519-525.

63. Shah, A., Cohen, I.S. and Rosen, M.R. (1988). Stimulation of cardiac α -1 receptors increases Na/K pump activity via a pertussis toxin sensitive pathway. *Biophys. J.* 54, 219-225.

64. Gintant, G. and Cohen, I. (1988). Advances in cardiac cellular electrophysiology: Implications for automaticity and therapeutics. *Ann. Rev. Pharmacol. Toxicol.* 28, 61-81.

65. Oliva, C., Cohen, I.S. and Mathias, R.T. (1988). Calculation of time constants for intracellular diffusion in whole cell patch clamp configuration. *Biophys. J.* 54, 791-799.
66. Rosen, M.R., Robinson, R.B., Cohen, I.S. and Bilezikian, J.P. (1989). Developmental changes in alpha adrenergic modulation of cardiac rhythm. In Physiology and Pathophysiology of the Heart, editor N. Sperelakis. Martinus Nijhoff Publishing, 2nd edition, pp. 413-422.
67. Cohen, I.S., DiFrancesco, D., Mulrine, N.K. and Pennefather, P. (1989). Internal and external K^+ affect the gating of the inward rectifier in cardiac Purkinje myocytes. *Biophys. J.* 55, 197-202.
68. Cohen, I.S., Chang, F. and Kline, R.P. (1989). Repetitive Activity - Origin of the Na^+ load and its Physiologic Effects. In Lethal Arrhythmias Resulting from Myocardial Ischemia and Infarction, editors M. Rosen and Y. Palti. Kluwer Academic Publishers, Boston, pp. 31-40.
69. Chang, F., Gao, J., Tromba, C., Cohen, I. and DiFrancesco, D. (1990). Acetylcholine reverses the effects of β agonists on i_f in canine cardiac Purkinje fibers but has no direct action: A difference between primary and secondary pacemakers. *Circ. Res.* 66, 633-636.
70. Pennefather, P. and Cohen, I.S. (1990). Molecular mechanisms of cardiac potassium channel regulation. In Cardiac Electrophysiology and Arrhythmias from Cell to Bedside, editors D. Zipes and J. Jalife. W.B. Saunders and Co., pp. 17-26.
71. Rosen, M.R., Belezekian, J.P., Cohen, I.S. and Robinson, R.B. (1990). Alpha-adrenergic modulation of cardiac rhythm. In Cardiac Electrophysiology and Arrhythmias from Cell to Bedside, editors D. Zipes and J. Jalife. W.B. Saunders and Co., pp. 300-304.
72. Cohen, I.S., Shah, A., Zaza, A., Kline, R. and Rosen, M.R. (1990). Ionic basis of the effects of alpha agonists on Purkinje myocytes. In Regulation of Potassium Transport Across Biological Membranes, editors L. Reuss, J. Russell and G. Szabo. University of Texas Press., pp. 429-441.
73. Kline, R.P., Zablow, L. and Cohen, I.S. (1990). Interaction of intracellular ion buffering with transmembrane coupled ion transport. *J. Gen. Physiol.* 95, 499-522.
74. Oliva, C., Cohen, I.S. and Pennefather, P. (1990). The mechanism of rectification of i_{K1} in canine Purkinje myocytes. *J. Gen. Physiol.* 96, 299-318.

75. Tromba, C. and Cohen, I.S. (1990). A novel action of isoproterenol to inactivate a cardiac K^+ current is not blocked by Beta or Alpha adrenergic blockers. *Biophys. J.* 58, 791-795.
76. Mathias, R.T., Cohen, I.S. and Oliva, C. (1990). Limitations of the whole cell patch clamp technique in the control of intracellular concentrations. *Biophys. J.* 58, 759-770.
77. Cohen, I. and Datyner, N. (1990). Repolarizing membrane currents. In Cardiac Electrophysiology: A Textbook, editors M.R. Rosen, M.J. Janse and A.L. Wit. Futura Press, NY, pp. 107-115.
78. Gintant, G.A., Cohen, I.S., Datyner, N.B. and Kline, R.P. (1991). Time-dependent outward currents in the heart. In Handbook of Experimental Cardiology, 2nd Edition, editors H. Fozzard, E. Haber, R. Jennings, A. Katz and H. Morgan. Raven Press. 1121-1169.
79. Cohen, I.S. and Datyner, N.B. (1991). The multicellular cardiac voltage clamp: Approaches and problems. In Basic and Clinical Electrophysiology and Pharmacology of the Heart, editors Dangman and Miura, pp. 33-40.
80. DiFrancesco, D., Porciatti, F. and Cohen, I.S. (1991). The effects of manganese and barium on i_f in rabbit sino-atrial node. *Experientia* 47, 449-452.
81. DiFrancesco, D., Porciatti, F., Janigro, D., Maccaferri, G., Mangoni, M., Tritella, T., Chang, F. and Cohen, I.S. (1991). Block of the cardiac pacemaker current (i_f) in rabbit SA node and in canine Purkinje fibres by 9-amino-1,2,3,4-tetrahydroacridine (THA). *Pflugers Arch.* 417, 611-615.
82. Chang, F., Cohen, I.S., DiFrancesco, D., Rosen, M.R. and Tromba, C. (1991). The effects of the protein kinase inhibitors H7 and H8 on Purkinje fiber pacemaker depolarization and i_f . *J. Physiol.* 440, 367-384.
83. Datyner, N.B. and Cohen, I.S. (1991). Modular cooling for tissue chambers and solutions: performance and design. *J. Neurosci. Meth.* 40, 49-62.
84. Chang, F. and Cohen, I.S. (1992). Mechanism of acetylcholine action on pacemaker current (i_f) in canine Purkinje fibers. *Pflugers Archiv.* 420, 389-392.
85. Gao, J., Mathias, R.T., Cohen, I.S. and Baldo, G.J. (1992). Isoprenaline, Ca^{2+} , and the Na^+ - K^+ pump in guinea-pig ventricular myocytes. *J. Physiol.* 449, 689-704.
86. Cui, J., Mandel, G., DiFrancesco, D., Kline, R.P., Pennefather, P., Datyner, N.B., Haspel, H.C. and Cohen, I.S. (1992). Expression and characterization of a canine

hippocampal inwardly rectifying K^+ current in *Xenopus* oocytes. *J. Physiol.* 457, 229-246.

87. Yu, H., Chang, F. and Cohen, I.S. (1993). Pacemaker current exists in ventricular myocytes. *Circ. Res.* 72, 232-236.

88. Yu, H., Chang, F. and Cohen, I.S. (1993). Phosphatase inhibition by calyculin A increases i_f in canine Purkinje fibers and myocytes. *Pflugers Arch.* 422, 614-616.

89. Datyner, N.B. and Cohen, I.S. (1993). Slow inactivation of L-type calcium current distorts the measurement of L and T-type calcium current in Purkinje myocytes. *J. Gen. Physiol.* 102, 859-869.

90. Chang, F., Yu, H. and Cohen, I.S. (1994). The actions of vasoactive intestinal peptide and neuropeptide Y on the pacemaker current i_f in canine Purkinje fibers. *Circ. Res.* 74, 157-162.

91. Gao, J., Cohen, I.S., Mathias, R.T. and Baldo, G.J. (1994). Regulation of the β -stimulation of the Na^+-K^+ pump current in guinea-pig ventricular myocytes by a cAMP-dependent PKA pathway. *J. Physiol.* 477, 373-380.

92. Cui, J., Kline, R.P., Pennefather, P. and Cohen, I.S. (1994). Gating of I_{sK} expressed in *Xenopus* oocytes depends on the amount of mRNA injected. *J. Gen. Physiol.* 104, 87-105.

93. Shvilkin, A., Danilo, P. Jr., Chevalier, P., Chang, F., Cohen, I.S. and Rosen, M.R. (1994). Vagal release of vasoactive intestinal peptide promotes vagotonic tachycardia in the isolated innervated rat heart. *Cardiovascular Res.* 28, 1769-1773.

94. Anyukhovsky, E.P., Steinberg, S.F., Cohen, I.S. and Rosen, M.R. (1994). Receptor-effector coupling pathway for α_1 -adrenergic modulation of abnormal automaticity in "ischemic" canine Purkinje fibers. *Circ. Res.* 74, 937-944.

95. Yu, H., Chang, F. and Cohen, I.S. (1995). Pacemaker current i_f in adult cardiac ventricular myocytes. *J. Physiol.* 485, 469-483.

96. Gao, J., Mathias, R.T., Cohen, I.S. and Baldo, G.J. (1995). Two functionally different Na/K pumps in cardiac myocytes from guinea pig ventricles. *J. Gen. Physiol.* 106, 995-1030.

97. Tromba, C. and Cohen, I.S. (1995). Effects of potassium channel openers on Na^+ and K^+ currents in rabbit sinus node and atrial myocytes. *Biochim. Biophys. Acta* 1266, 268-272.

98. Vassalle, M., Yu, H. and Cohen, I.S. (1995). The pacemaker current in cardiac Purkinje myocytes. *J. Gen. Physiol.* 106, 559-578.
99. Rosen, M.R., Robinson, R.B., Cohen, I.S., Steinberg, S.F. and Bilezikian, J.P. (1995). Alpha-adrenergic modulation of cardiac rhythm in the developing heart. In Physiology and Pathophysiology of the Heart, 3rd Edition, editor N. Sperelakis. Kluwer Academic Publishers, pp. 457-465.
100. Cui, J., Yu, H., Kline, R.P., Pennefather, P. and Cohen, I.S. (1995). The I_{SK} channel exhibits multiple open states that may reflect different levels of aggregation. In Potassium Channels in Normal and Pathological Conditions. Symposium in honour of Prof. Dr. Edward Carmeliet. Leuven University Press, pp. 221-226.
101. Gao, J., Mathias, R.T., Cohen, I.S., Shi, J. and Baldo, G.J. (1996). The effects of β -stimulation on the Na/K pump current-voltage relationship in guinea pig ventricular myocytes. *J. Physiol.* 494, 697-708.
102. Charpentier, F., Legato, M., Steinberg, S., Cohen, I.S. and Rosen, M.R. (1996). Beta-adrenergic modulation of Na/K pump activity in young and adult canine cardiac Purkinje fibers. *Am. J. Physiol.* 40, H706-H712.
103. Dixon, J.E., Shi, W., McDonald, C., Wang, H.-S., Yu, H., Wymore, R.S., Cohen, I.S. and McKinnon, D. (1996). The role of the Kv4.3 potassium channel in ventricular muscle. *Circ. Res.* 79, 659-668.
104. Robinson, R.B., Yu, H., Chang, F., Kuznetsov, Y. and Cohen, I.S. (1997). Developmental change in the voltage-dependence of the pacemaker current, i_f , in rat ventricle cells. *Pflugers Arch.* 433, 533-535.
105. Hara, M., Liu, Y.-M., Zhen, L.C., Cohen, I.S., Yu, H., Danilo, P., Jr., Ogino, K., Bilezikian, J.P. and Rosen, M.R. (1997). The positive chronotropic actions of parathyroid hormone and parathyroid hormone-related peptide are due to increases in the current, i_f , and the slope of the pacemaker. *Circulation* 96, 3704-3709.
106. Gao, J., Mathias, R.T., Cohen, I.S. and Baldo, G.J. (1997). Effects of acetylcholine effects on the Na/K pump current in guinea pig ventricular myocytes. *J. Physiol.* 501, 527-535.
107. Wymore, R.S., Gintant, G.A., Wymore, R.T., Dixon, J.E., McKinnon, D. and Cohen, I.S. (1997). Tissue and species distribution of mRNA for the i_{kr} -like potassium channel, ERG. *Circ. Res.* 80, 261-268.

108. Wu, J. and Cohen, I.S. (1997). Tyrosine kinase inhibition reduces I_f in rabbit SA node myocytes. *Pflugers Archiv.* 434, 509-514.
109. Shi, W., Wymore, R.S., Wang, H.S., Pan, Z., Cohen, I.S., McKinnon, D. and Dixon, J.E. (1997). Identification of two nervous system specific members of the erg potassium channel gene family. *J. Neurosci.* 17, 9423-9432.
110. Liu, Y.M., Yu, H., Li, C.Z., Cohen, I.S. and Vassalle, M. (1998). Cesium effects on i_f and i_K in the pacemaker potential range in rabbit SA node myocytes: Implications for the role of i_f and i_K in sinus automaticity. *J. Cardiovasc. Pharm.* 32, 783-790.
111. Gao, J., Cohen, I.S., Mathias, R.T. and Baldo, G.J. (1998). The inhibitory effect of β -stimulation on the Na/K pump current in guinea pig ventricular myocytes is mediated by a cAMP-dependent PKA pathway. *Pflugers Archiv.* 435, 479-484.
112. Wang, Y., Gao, J., Mathias, R.T., Cohen, I.S., Sun, X. and Baldo, G.J. (1998). α -adrenergic effects on Na^+ - K^+ pump current in guinea-pig ventricular myocytes. *J. Physiol.* 509, 117-128.
113. Shi, W., Wang, H.-S., Pan, Z., Wymore, R.S., Cohen, I.S., McKinnon, D. and Dixon, J.E. (1998). Cloning of a mammalian elk potassium channel gene and EAG mRNA distribution in rat sympathetic ganglia. *J. Physiol.* 511, 675-682.
114. Wang, H.-S., Pan, Z., Shi, W., Brown, B.S., Wymore, R.S., Cohen, I.S., Dixon, J.E. and McKinnon, D. (1998). KCNQ2 and KCNQ3 potassium channel subunits: Molecular correlates of the M-channel. *Science* 282, 1890-1893.
115. Rosen, M.R., Cohen, I.S., Danilo, P., Jr., and Steinberg, S.F. (1998). The heart remembers. *Cardiovasc. Res.* 40, 469-482.
116. Liu, Y.M., Li, C., Yu, H. and Cohen, I.S. (1999). Phosphorylation regulates i_f in rabbit sinoatrial node myocytes. (submitted).
117. Ricard, P., Danilo, P., Jr., Cohen, I.S., Burkhoff, D. and Rosen, M.R. (1999). A role for the renin angiotensin system in the evolution of cardiac memory. *J. Cardiovasc. Electrophysiol.* 10, 545-551.
118. Gao, J., Mathias, R.T., Cohen, I.S., Wang, X., Sun, X. and Baldo, G.J. (1999). Activation of PKC increases Na^+ - K^+ pump current in ventricular myocytes from guinea pig heart. *Pflugers Archiv.* 437, 643-651.
119. Shi, W., Wymore, R., Yu, H., Wu, J., Wymore, R.T., Pan, Z., Robinson, R.B., Dixon, J.E., McKinnon, D. and Cohen, I.S. (1999). Distribution and prevalence of

hyperpolarization-activated cation channel (HCN) mRNA expression in cardiac tissues. *Circ. Res.* 85, E1-E6.

120. Yu, H., McKinnon, D., Dixon, J.E, Gao, J., Wymore, R., Cohen, I.S., Danilo Jr., P., Shvilkin, A., Anyukhovskiy, E.P., Sosunov, E.A., Hara, M. and Rosen, M.R. (1999). Transient outward current, I_{to1} , is altered in cardiac memory. *Circulation* 99, 1898-1905.

121. Clausen, C., Rosen, M.R. and Cohen, I.S. (1999). Synthesis of the cardiac Purkinje-fiber action potential using a computer model. In An Introduction to Cardiac Electrophysiology, editors A. Zaza and M.R. Rosen, IPD, Chennai. (in press).

122. Gao, J., Wymore, R., Wymore, R.T., Wang, Y., McKinnon, D., Dixon, J.E., Mathias, R.T., Cohen, I.S. and Baldo, G.J. (1999). Isoform-specific regulation of the sodium pump by α - and β -adrenergic agonists in the guinea-pig ventricle. *J. Physiol.* 516.2, 377-383.

123. Vassalle, M., Yu, H. and Cohen, I.S. (2000). Pacemaker channels and cardiac automaticity. In Cardiac Electrophysiology. From Cell to Bedside, editors D. Zipes and J. Jalife, 3rd Edition, W.B. Saunders and Co., pp. 94-103.

124. Mathias, R.T., Cohen, I.S., Gao, J. and Wang, Y. (2000). Isoform specific regulation of the Na/K pump in heart. *News Physiol. Sci.* 15, 176-180.

125. Qu, J., Cohen, I.S. and Robinson, R.B. (2000). Sympathetic innervation alters activation of pacemaker current (I_f) in rat ventricle. *J. Physiol.* 526.3, 561-569.

126. Wang, H.-S., Brown, B.S., McKinnon, D. and Cohen, I.S. (2000). Molecular basis for differential sensitivity of KCNQ and I_{Ks} channels to the cognitive enhancer XE991. *Molecular Pharm.* 57, 1218-1223.

127. Yu, H., Gao, J., Wang, H., Wymore, R., Steinberg, S., McKinnon, D., Rosen, M.R. and Cohen, I.S. (2000). Effects of the renin-angiotensin system on the current I_{to} in epicardial and endocardial ventricular myocytes from the canine heart. *Circ. Res.* 86, 1062-1068.

128. Wu, J. and Cohen, I.S. (2000). Epidermal growth factor increases i_f in rabbit SA node cells by activating a tyrosine kinase. *Biochimica et Biophysica Acta* 1463, 15-19.

129. Yu, H., Wu, J., Potapova, I., Wymore, R.T., Holmes, B., Zuckerman, J., Pan, Z., Wang, H., Shi, W., Robinson, R.B., El-Maghrabi, M.R., Benjamin, W., Dixon, J., McKinnon, D., Cohen, I.S. and Wymore, R. (2001). MinK-related peptide 1. A β Subunit for the HCN ion channel subunit family enhances expression and speeds activation. *Circ. Res.* 88, e84-e87.

130. Qu, J., Barbuti, A., Protas, L., Santoro, B., Cohen, I.S., and Robinson, R.B. (2001). HCN2 overexpression in newborn and adult ventricular myocytes. Distinct effects on gating and excitability. *Circ. Res.* 89, e8-e14.
131. Rosati, B., Pan, Z., Lypen, S., Wang, H.-S., Cohen, I.S., Dixon, J.E. and McKinnon, D. (2001). Regulation of KChIP2 potassium channel β subunit gene expression underlies the gradient of transient outward current in canine and human ventricle. *J. Physiol.* 533.1, 119-125.
132. Gao, J., Wymore, R.S., Wang, Y., Gaudette, G.R., Krukenkamp, I.B., Cohen, I.S. and Mathias, R.T. (2002). Isoform specific stimulation of the Na/K pump by nM concentrations of dihydroouabain in mammalian heart. *J. Gen. Physiol.* 119, 297-312.
133. Qu, J., Plotnikov, A.N., Danilo, P., Shlapakova, I., Cohen, I.S., Robinson, R.B. and Rosen, M.R. (2003). Expression and function of a biological pacemaker in canine heart. *Circulation* 107, 1106-1109.
134. Wang, H.-S. and Cohen, I.S. (2003). Calcium channel heterogeneity in canine left ventricular myocytes. *J. Physiol.* 547.3, 825-833.
135. Plotnikov, A.N., Yu, H., Geller, J.C., Gainullin, R.Z., Chandra, P., Patberg, K.W., Frieze, S., Danilo, P., Jr., Cohen, I.S., Feinmark, S. and Rosen, M.R. (2003). Role of L-type calcium channels in pacing-induced short-term and long-term cardiac memory in canine heart. *Circulation* 107, 2844-2849.
136. Irie, H., Gao, J., Gaudette, G.R., Cohen, I.S., Mathias, R.T., Saltman, A.E. and Krukenkamp, I.B. (2003). Both metabolic inhibition and mitochondrial K_{ATP} channel opening are myoprotective and initiate a compensatory sarcolemmal outward membrane current. *Circulation* 108[suppl II], II-341-II-347.
137. Yu, H.-G., Lu, Z., Pan, Z. and Cohen, I.S. (2004). Tyrosine kinase inhibition differentially regulates heterologously expressed HCN channels. *Pflügers Archiv.* 447, 392-400).
138. Plotnikov, A.N., Sosunov, E.A., Qu, J., Shlapakova, I.N., Anyukhovskiy, E.P., Liu, L., Janse, M.J., Brink, P.R., Cohen, I.S., Robinson, R.B., Danilo, P., Jr., Rosen, M.R. (2004). Biological pacemaker implanted in canine left bundle branch provides ventricular escape rhythms that have physiologically acceptable rates. *Circulation* 109, 506-512.
139. Valiunas, V., Doronin, S., Valiuniene, L., Potapova, I., Zuckerman, J., Walcott, B., Robinson, R.B., Rosen, M.R., Brink, P.R. and Cohen, I.S. (2004). Human mesenchymal stem cells make cardiac connexins and form functional gap junctions. *J. Physiol.* 555, 617-

626.

140. Potapova, I., Plotnikov, A., Lu, Z., Danilo, P., Jr., Valiunas, V., Qu, J., Doronin, S., Zuckerman, J., Shlapakova, I.N., Gao, J., Pan, Z., Herron, A.J., Robinson, R.B., Brink, P.R., Rosen, M.R. and Cohen, I.S. (2004). Human mesenchymal stem cells as a gene delivery system to create cardiac pacemakers. *Circ. Res.* 94, 952-959.
141. Robinson, R.B., Brink, P.R., Cohen, I.S. and Rosen, M.R. (2004). Overexpressing the i_f current as a therapeutic strategy to compensate for atrioventricular block. *Ital. Heart J.* 5[suppl 1], 58S-61S.
142. Rosen, M.R., Brink, P.R., Cohen, I.S. and Robinson, R.B. (2004). Cardiac pacemakers for the new millennium. *Hellenic J. Cardiol.* 45, 205-207.
143. Qu, J., Kryukova, Y., Potapova, I.A., Doronin, S.V., Larsen, M., Krishnamurthy, G., Cohen, I.S. and Robinson, R.B. (2004). MiRP1 modulates HCN2 channel expression and gating in cardiac myocytes. *J. Biol. Chem.* 279, 43497-43502.
144. Rosen, M.R., Brink, P.R., Cohen, I.S. and Robinson, R.B. (2004). Genes, stem cells and biological pacemakers. *Cardiovasc. Res.* 64, 12-23.
145. Doronin, S.V., Potapova, I.A., Lu, Z. and Cohen, I.S. (2004). Angiotensin receptor type 1 forms a complex with the transient outward potassium channel Kv4.3 and regulates its gating properties and intracellular localization. *J. Biol. Chem.* 279, 48231-48237.
146. Rosen, M.R., Robinson, R.B., Brink, P. and Cohen, I.S. (2004). Recreating the biological pacemaker. *Anat. Rec. Part A* 280A, 1046-1052.
147. Rosen, M.R., Brink, P.R., Cohen, I.S. and Robinson, R.B. (2005). Adult human stem cells as a platform for gene therapy: fabricating a biological pacemaker. *Discovery Medicine* 5, 18-24.
148. Cohen, I.S. and Robinson, R.B. (2005). Pacemaker currents and automatic rhythms: toward a molecular understanding. In: *Basis and Treatment of Cardiac Arrhythmias*. CE Clancy, RS Kass (eds), Berlin, Springer Verlag pp. 41-71.
149. Danilo, P., Jr, Girouard, S., Brink, P.R., Cohen, I.S., Robinson, R.B. and Rosen, M.R. (2005). Gene and cell therapy for sinus and AV nodal dysfunction. In: *New Arrhythmia Technologies*. PJ Wang (ed) pp. 54-64.
150. Cohen, I.S., Brink, P.R., Robinson, R.B. and Rosen, M.R. (2005). The why, what, how and when of biological pacemakers. *Nature Clinical Practice* 2, 374-375.

151. Kochupura, P.V., Azeloglu, E.U., Kelly, D.J., Doronin, S.V., Badylak, S.F., Krukenkamp, I.B., Cohen, I.S. and Gaudette, G.R. (2005). A tissue engineered myocardial patch derived from extracellular matrix provides regional mechanical function. *Circulation (Suppl.)* 112, I-144 – I-149.
152. Valiunas, V., Polosina, Y.Y., Miller, H., Potapova, I.A., Valiuniene, L., Doronin, S., Mathias, R.T., Robinson, R.B., Rosen, M.R., Cohen, I.S., and Brink, P.R. (2005). Connexin-specific cell to cell transfer of short interfering RNA by gap junctions. *J. Physiol.* 568.2, 459-468.
153. Lu, Z., Jiang, Y.-P., Ballou, L.M., Cohen, I.S. and Lin, R.Z. (2005). $G\alpha_q$ inhibits cardiac L-type Ca^{2+} channels through phosphatidylinositol 3-kinase. *J. Biol. Chem.* 280, 40347-40354.
154. Fan, G., Jiang, Y.-P., Lu, Z., Martin, D.W., Kelly, D.J., Zuckerman, J.M., Ballou, L.M., Cohen, I.S. and Lin, R.Z. (2005). A transgenic mouse model of heart failure using inducible $G\alpha_q$. *J. Biol. Chem.* 280, 40337-40346.
155. Robinson, R.B., Rosen, M.R., Brink, P.R. and Cohen, I.S. (2005). Letter regarding the article by Xue et al., "Functional integration of electrically active cardiac derivatives from genetically engineered human embryonic stem cells with quiescent recipient ventricular cardiomyocytes". *Circulation* 112, e82-e83.
156. Gao, J., Wang, W., Cohen, I.S. and Mathias, R.T. (2005). Transmural gradients in Na/K pump activity and $[Na^+]_i$ in canine ventricle. *Biophys. J.* 89, 1700-1709.
157. Robinson, R.B., Brink, P.R., Cohen, I.S. and Rosen, M.R. (2006). I_f and the biological pacemaker. *Pharmacol. Res.* 53, 407-415.
158. Rosen, M.R. and Cohen, I.S. (2006). Cardiac memory....new insights into molecular mechanisms. *J. Physiol.* 570.2, 209-218.
159. Rosen, M.R. and Cohen, I.S. (2006). Molecular/genetic determinants of repolarization and their modification by environmental stress. *J. Internal Med.* 259, 7-23.
160. Badylak, S.F., Kochupura, P.V., Cohen, I.S., Doronin, S.V., Saltman, A.E., Gilbert, T.W., Kelly, D.J., Ignatz, D.J. and Gaudette, G.R. (2006). The use of extracellular matrix as an inductive scaffold for the partial replacement of functional myocardium. *Cell Transplantation* 15, Suppl. 1, 1-12.
161. Brink, P.R., Valiunas, V., Doronin, S., Potapova, I., Robinson, R.B., Mathias, R.T. and Cohen, I.S. (2006). Targeted cell based delivery of siRNA. *Physiology News* 63, 16-17.

162. Arinsburg, S.S., Cohen, I.S. and Yu, H.-G. (2006). Constitutively active Src tyrosine kinase changes gating of HCN4 channels through direct binding to the channel proteins. *J. Cardiovasc. Pharmacol.* 47, 578-586.
163. Jiang, Y.-P., Ballou, L.M., Lu, Z., Wan, L., Kelly, D.J., Cohen, I.S. and Lin, R.Z. (2006). Reversible heart failure in $G\alpha_q$ transgenic mice. *J. Biol. Chem.* 281, 29988-29992.
164. Bucchi, A., Plotnikov, A.N., Shlapakova, I., Danilo, P., Jr., Kryukova, Y., Qu, J., Lu, Z., Liu, H., Pan, Z., Potapova, I., KenKnight, B., Girouard, S., Cohen, I.S., Brink, P.R., Robinson, R.B. and Rosen, M.R. (2006). Wild-type and mutant HCN channels in a tandem biological-electronic cardiac pacemaker. *Circulation* 114, 992-999.
165. Rosen, M.R., Brink, P.R., Cohen, I.S. and Robinson, R.B. (2007). Biological pacemakers based on I_f . *Med. Biol. Eng. Comput.* 45, 157-166.
166. Cohen, I.S., Rosen, A.B. and Gaudette, G.R. (2007). A *Caveat Emptor* for myocardial regeneration: Mechanical without electrical recovery will not suffice. *J. Mol. Cell. Cardiol.* 42, 285-288.
167. Gaudette, G.R. and Cohen, I.S. (2006). Cardiac regeneration: materials can improve the passive properties of myocardium but cell therapy must do more. *Circulation* 114, 2575-2577.
168. Rosen, M.R., Brink, P.R., Cohen, I.S. and Robinson, R.B. (2007). Physiological and other biological pacemakers. In *Electrical Diseases of the Heart and Sudden Cardiac Death: Genetics, Mechanisms, Treatment, and Prevention*; ed by C. Antzelevich et al: Springer. (in press).
169. Potapova, I.A., Cohen, I.S. and Doronin, S.V. (2007). Voltage-gated ion channel Kv4.3 is associated with Rap guanine nucleotide exchange factors and regulates angiotensin receptor type 1 signaling to small G-protein Rap. *FEBS J.* 274, 4375-4384.
170. Lu, Z., Jiang, Y.-P., Ballou, L.M., Cohen, I.S. and Lin, R.Z. (2007). Decreased L-type Ca^{2+} current in cardiac myocytes of type 1 diabetic akita mice due to reduced phosphatidylinositol 3-kinase signaling. *Diabetes* 56, 2780-2789.
171. Rosen, A.B., Kelly, D.J., Schuldt, A.J.T., Lu, J., Potapova, I.A., Doronin, S.V., Robichaud, K.J., Robinson, R.B., Rosen, M.R., Brink, P.R., Gaudette, G.R. and Cohen, I.S. (2007). Finding fluorescent needles in the cardiac haystack: Tracking human mesenchymal stem cells labeled with quantum dots for quantitative *in vivo* 3-D fluorescence analysis. *Stem Cells* 25, 2128-2138.

172. Plotnikov, A.N., Shlapakova, I., Szabolcs, M.J., Danilo, P., Jr., Lorell, B.H., Potapova, I.A., Lu, Z., Rosen, A.B., Mathias, R.T., Brink, P.R., Robinson, R.B., Cohen, I.S. and Rosen, M.R. (2007). Xenografted adult human mesenchymal stem cells provide a platform for sustained biological pacemaker function in canine heart. *Circulation* 116, 706-713.
173. Potapova, I.A., Gaudette, G.R., Brink, P.R., Robinson, R.B., Rosen, M.R., Cohen, I.S., Doronin, S.V. (2007). Mesenchymal stem cells support migration, extracellular matrix invasion, proliferation and survival of endothelial cells in vitro. *Stem Cells* 25, 1761-1768.
174. Doronin, S.V., Potapova, I.A., Kelly, D.J., Schuldt, A.J., Rosen, A.B., Brink, P.R., Robinson, R.B., Rosen, M.R., Gaudette, G. and Cohen, I.S. (2007). Genetically engineered stem cells for mechanical and electrical myocardial repair. In "Rebuilding the Infarcted Heart", eds. K.C. Wollert and L.S. Field, Informa Healthcare, Informa Plc. pp. 155-167.
175. Potapova, I.A., Doronin, S.V., Kelly, D.J., Rosen, A.B., Schuldt, A.J.T., Lu, Z., Guo, Y., Kochupura, P.V., Robinson, R.B., Rosen, M.R., Brink, P.R., Gaudette, G.R. and Cohen, I.S. (2007). Replacing damaged myocardium. *J. Electrocardiology* 40, S199-S201.
176. Lu, Z., Gao, J., Zuckerman, J., Mathias, R.T., Gaudette, G., Krukenkamp, I. and Cohen, I.S. (2007). Two-pore K⁺ channels, NO and metabolic inhibition. *Biochem. Biophys. Res. Comm.* 363, 194-196.
177. Plotnikov, A.N., Bucchi, A., Shlapakova, I., Danilo, P., Jr., Brink, P.R., Robinson, R.B., Cohen, I.S. and Rosen, M.R. (2008). HCN212-channel biological pacemakers manifesting ventricular tachyarrhythmias are responsive to treatment with I_f blockade. *Heart Rhythm* 5, 282-288.
178. Potapova, I.A., Brink, P.R., Cohen, I.S. and Doronin, S.V. (2008). Culturing of human mesenchymal stem cells as three-dimensional aggregates induces functional expression of CXCR4 that regulates adhesion to endothelial cells. *J. Biol. Chem.* 283, 13100-13107.
179. Schuldt, A.J.T., Rosen, M.R., Gaudette, G.R. and Cohen, I.S. (2008). Repairing damaged myocardium: evaluating cells used for cardiac regeneration. *Current Treatment Options in Cardiovascular Medicine* 10, 59-72.
180. Rosen, M.R., Brink, P.R., Cohen, I.S., Danilo, P., Jr., Robinson, R.B., Rosen, A.B., and Szabolcs, M.J. (2008). Regenerative therapies in electrophysiology and pacing. *J. Interventional Cardiac Electrophys.* 22, 87-98.
181. Rosen, M.R., Brink, P.R., Cohen, I.S. and Robinson, R.B. (2008). The utility of mesenchymal stem cells as biological pacemakers. *Congestive Heart Failure* 14, 153-156.

182. Protas, L., Dun, W., Jia, Z., Lu, J., Bucchi, A., Kumari, S., Chen, M., Cohen, I.S., Rosen, M.R., Entcheva, E. and Robinson, R.B. (2009). Expression of skeletal but not cardiac Na⁺ channel isoform preserves normal conduction in a depolarized cardiac syncytium. *Cardiovasc. Res.* 81, 528-535.
183. Potapova, I.A., Doronin, S.V., Kelly, D.J., Rosen, A.B., Schuldt, A.J., Lu, Z., Kochupura, P.V., Robinson, R.B., Rosen, M.R., Brink, P.R., Gaudette, G.R. and Cohen, I.S. (2008). Enhanced recovery of mechanical function in the canine heart by seeding an extracellular matrix patch with mesenchymal stem cells committed to a cardiac lineage. *Am. J. Physiol. Heart Circ. Physiol.* 295, H2257-H2263.
184. Kelly, D.J., Rosen, A.B., Schuldt, A.J.T., Kochupura, P.V., Doronin, S.V., Potapova, I.A., Azeloglu, E.U., Badlyak, S.F., Brink, P.R., Cohen, I.S. and Gaudette, G.R. (2009). Increased myocyte content and mechanical function within a tissue engineered myocardial patch following implantation. *Tissue Engineering* (Feb. 10, Epub ahead of print).
185. Lau, D.H., Clausen, C., Sosunov, E.A., Shlapakova, I.N., Anyukhovsky, E.P., Danilo, P., Jr., Rosen, T.S., Kelly, C., Duffy, H.S., Szabolcs, M.J., Chen, M., Robinson, R.B., Lu, J., Kumari, S., Cohen, I.S. and Rosen, M.R. (2009). Epicardial border zone overexpression of skeletal muscle sodium channel skM1 normalizes activation, preserves conduction, and suppresses ventricular arrhythmia. *Circulation* 119, 19-27.
186. Potapova, I.A., Cohen, I.S. and Doronin, S.V. (2009). Apoptotic endothelial cells demonstrate increased adhesiveness for human mesenchymal stem cells. *J. Cell. Physiol.* 219, 23-30.